

PCT INTERNATIONAL COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BARKER BRETTELL
138 Hagley Road
Edgbaston
Birmingham B16 9PW
ROYAUME-UNI

Date of mailing (day/month/year) 15 February 2001 (15.02.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference PB767/PCT/RS	
International application No. PCT/EP00/05471	International filing date (day/month/year) 14 June 2000 (14.06.00)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

SAVIDGE, Roger, Gordon, Madgwick
Rhodia Consumer Specialties Limited
210-222 Hagley Road West
Oldbury
West Midlands B68 0NN
United Kingdom

State of Nationality

State of Residence

Telephone No.

+44 121 420 5430

Facsimile No.

+44 121 420 5437

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address

BARKER BRETTELL
138 Hagley Road
Edgbaston
Birmingham B16 9PW
United Kingdom

State of Nationality

State of Residence

Telephone No.

0121-456-1364

Facsimile No.

0121-456-1368

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Juan Cruz

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

P. ENT COOPERATION TREA

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 15 February 2001 (15.02.01)	Applicant's or agent's file reference PB767/PCT/RS
International application No. PCT/EP00/05471	Priority date (day/month/year) 18 June 1999 (18.06.99)
International filing date (day/month/year) 14 June 2000 (14.06.00)	
Applicant JONES, Christopher, Raymond et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

10 January 2001 (10.01.01)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
--	--

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

SAVIDGE, Roger, Gordon, Madgwick
Rhodia Consumer Specialties Limited
210-222 Hagley Road West
Oldbury
West Midlands B68 ONN
ROYAUME-UNI

Date of mailing (day/month/year) 30 August 2000 (30.08.00)	
Applicant's or agent's file reference PB767/PCT/RS	IMPORTANT NOTIFICATION
International application No. PCT/EP00/05471	International filing date (day/month/year) 14 June 2000 (14.06.00)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 18 June 1999 (18.06.99)
Applicant RHODIA CONSUMER SPECIALTIES LIMITED et al	

- The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
- An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
18 June 1999 (18.06.99)	9914139.2	GB	16 Augu 2000 (16.08.00)
04 Augu 1999 (04.08.99)	9918243.8	GB	16 Augu 2000 (16.08.00)
10 Augu 1999 (10.08.99)	9918698.3	GB	16 Augu 2000 (16.08.00)

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

Eugénia Santos

Telephone No. (41-22) 338.83.38

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference CDK1777	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/05471	International filing date (day/month/year) 14/06/2000	Priority date (day/month/year) 18/06/1999
International Patent Classification (IPC) or national classification and IPC C14C3/08		
Applicant RHODIA CONSUMER SPECIALTIES LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☒ Certain observations on the international application

Date of submission of the demand 10/01/2001	Date of completion of this report 07.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Barker, S Telephone No. +49 89 2399 8526 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/05471

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-15 as originally filed

Claims, No.:

1-7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4. The amendments have resulted in the cancellation of:
- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:
5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/05471

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-7
	No: Claims
Inventive step (IS)	Yes: Claims 1-7
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-7
	No: Claims

2. Citations and explanations see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re. part V

- 1). The subject matter of the claims 1-7 is considered to be new and appears to involve an inventive step over the four documents cited in the International Search Report, which were cited as technical background (category "A") only. Accordingly, the requirements of Arts.33 (2) and (3) are considered fulfilled as are those of Art.33(4) as all claimed subject matter is considered to be capable of industrial application.

Re. part VIII

- 2). a) In claim 1 and the statement of invention in the description, the substances referred to as "THP", "THP salt", "THP condensate" and "THP analogue" should be referred to by their full names although "THP analogue" would appear to be a vague term which would be better defined by the definition given in the description at the paragraph bridging pages 3 and 4. (Art. 6 PCT)
- b) In claim 1 and the description, "pyrrolidone" should be spelled correctly. (Art.6 PCT)
- c) Claims 6 and 7 relate to steps in the preparation of leather which are not tanning steps per se. It appears that these claims are not correctly dependent on claim 4 and should therefore be reformulated. (Art.6 PCT)
- d) The description at the first full paragraph of page 4 is considered confusing as it makes unclear what precisely is intended by the initials "THP". suitable amendment is invited (Art.6 PCT).
- e) Regarding the explanation given at page 6 of the terms "adjacent", "vicinal" and "geminal", it is believed that in trimethylolpropane (2-ethyl-2-hydroxymethyl-1,3-propandiol, $\text{H}_5\text{C}_2\text{-C}(\text{CH}_2\text{OH})_3$) all methylol groups are attached to an "end" carbon of the propane chain which would make it another example of a geminal compound not a vicinal compound as described. Clarification is invited although care should be taken not to introduce new subject matter (Art.6 PCT).

From the INTERNATIONAL BUREAU

To:

SAVIDGE, Roger, Gordon, Madgwick
Rhodia Consumer Specialties Limited
210-222 Hagley Road West
Oldbury
West Midlands B68 9NN
ROYAUME-UNI

BANKER BREITTELL

10 JAN 2001

RECEIVED

IMPORTANT NOTICE

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

Date of mailing (day/month/year) 28 December 2000 (28.12.00)		
Applicant's or agent's file reference PB767/PCT/RS		
International application No. PCT/EP00/05471	International filing date (day/month/year) 14 June 2000 (14.06.00)	Priority date (day/month/year) 18 June 1999 (18.06.99)
Applicant RHODIA CONSUMER SPECIALTIES LIMITED et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AG,AU,DZ,KP,KR,MZ,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
28 December 2000 (28.12.00) under No. WO 00/79011

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

**NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF
THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES**

Date of mailing (day/month/year) 28 December 2000 (28.12.00)	IMPORTANT NOTICE
Applicant's or agent's file reference PB767/PCT/RS	International application No. PCT/EP00/05471
<p>The applicant is hereby notified that, at the time of establishment of this Notice, the time limit under Rule 46.1 for making amendments under Article 19 has not yet expired and the International Bureau had received neither such amendments nor a declaration that the applicant does not wish to make amendments.</p>	

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

CONFIRMATION COPY

International Application No.

14 JUN 2000

PCT/EP 00 / 05 471

International Filing Date

(14. 06. 2000)

EUROPEAN PATENT OFFICE

PCT INTERNATIONAL APPLICATION

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference

(if desired) (12 characters maximum)

PB767/PCT/RS

Box No. I TITLE OF INVENTION

LEATHER TANNING

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

RHODIA CONSUMER SPECIALTIES LIMITED
210-222 HAGLEY ROAD WEST
OLDBURY
WEST MIDLANDS B68 0NN
GREAT BRITAIN

☐ This person is also inventor.

Telephone No.

+44 121 420 5430

Facsimile No.

+44 121 420 5437

Teleprinter No.

336291 ALBRIW G

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

JONES Christopher Raymond
110 Sutherland Road
Cheslyn Hay
Nr. Walsall
West Midlands WS6 7BS
GREAT BRITAIN

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

SAVIDGE Roger Gordon Madgwick
Rhodia Consumer Specialties Limited
210-222 Hagley Road West
Oldbury, West Midlands,
B68 0NN GREAT BRITAIN

Telephone No.

+44 121 420 5430

Facsimile No.

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Teleprinter No.

336291 ALBRIW G

☐ Address for correspondence: Mark this check-box where no agent or common representative is has been appointed and the space above is used instead to a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
<i>If none of the following sub-boxes is used, this sheet should not be included in the request.</i>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p> <p>COLLINS Gareth Rhys</p> <p>22 Surrey Drive Kingswinford Dudley West Midlands DY6 8HR GREAT BRITAIN</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input checked="" type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
<p>This person is applicant for the purposes of:</p> <p><input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p> <p>TALBOT Robert Eric</p> <p>3 Meriden Close Cannock Staffordshire WS11 1QG GREAT BRITAIN</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input checked="" type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
<p>This person is applicant for the purposes of:</p> <p><input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of:</p> <p><input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)</p>
State (that is, country) of nationality:	State (that is, country) of residence:
<p>This person is applicant for the purposes of:</p> <p><input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p><input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.</p>	

Box No. V DESIGNATION OF STATES

The following designations are hereby ☒ under Rule 4.9(a) (mark the applicable check-box. ☒ at least one must be marked):

Regional Patent

- ☒ AP ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BR Brazil | |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IS Iceland | |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> ZA South Africa |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet: |
| <input checked="" type="checkbox"/> KZ Kazakhstan | <input checked="" type="checkbox"/> AG ANTIGUA & BARBUDA |
| <input checked="" type="checkbox"/> LC Saint Lucia | <input checked="" type="checkbox"/> DZ ALGERIA |
| <input checked="" type="checkbox"/> LK Sri Lanka | <input checked="" type="checkbox"/> MOZAMBIQUE |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Supplemental Box If the Supplemental Box is not used, this sheet should not be included in the request.

1. If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

- (i) if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available; in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
- (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;
- (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;
- (iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
- (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
- (vi) if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;
- (vii) if, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.

2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

3. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.

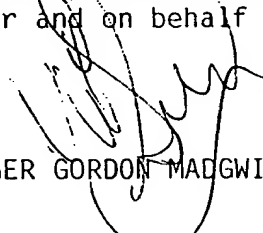
[CONTINUATION OF BOX NO. V] [▲]

[Designations (continued)] [▲]

[x] MZ MOZAMBIQUE [▲]

[x] BZ BELIZE [▲]

▲
RO/EP

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 18 JUNE 1999 (18/06/1999)	9914139.2	GB		
item (2) 4 AUGUST 1999 (04/08/1999)	9918243.8	GB		
item (3) 10 AUGUST 1999 (10/08/1999)	9918698.3	GB		
<input type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):				
<i>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</i>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): Date (day/month/year) Number Country (or regional Office)		
ISA / EP				
Box No. VIII CHECK LIST: LANGUAGE OF FILING				
This international application contains the following number of sheets: request : 5 description (excluding sequence listing part) : 15 claims : 1 abstract : 1 drawings : - sequence listing part of description : - Total number of sheets : 22		This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney TO FOLLOW 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: & copy of General power of signatory 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): X3 TO FOLLOW 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): Change of Name Certificate		
Figure of the drawings which should accompany the abstract: N/A		Language of filing of the international application: ENGLISH		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request). For and on behalf of Rhodia Consumer Specialties Limited  ROGER GORDON MADGWICK SAVIDGE - By Power of Attorney				

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:	14 JUN 2000 (14. 06. 2000)	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent):	ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

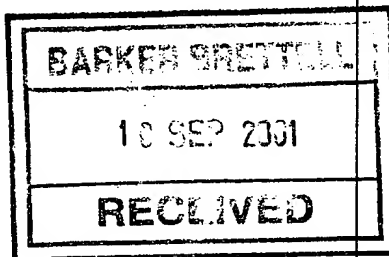
For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

BARKER BRETELL
138 Hagley Road
Edgbaston
Birmingham B16 9PW
GRANDE BRETAGNE



PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year) 07.09.2001

Applicant's or agent's file reference
CDK1777

IMPORTANT NOTIFICATION

International application No.
PCT/EP00/05471

International filing date (day/month/year)
14/06/2000

Priority date (day/month/year)
18/06/1999

Applicant
RHODIA CONSUMER SPECIALTIES LIMITED et al.

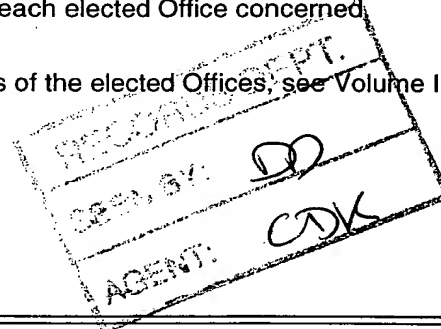
1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.



Name and mailing address of the IPEA/

 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Le Bolloch, C

Tel. +49 89 2399-8091



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CDK1777	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/05471	International filing date (<i>day/month/year</i>) 14/06/2000	Priority date (<i>day/month/year</i>) 18/06/1999
International Patent Classification (IPC) or national classification and IPC C14C3/08		
Applicant RHODIA CONSUMER SPECIALTIES LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 10/01/2001	Date of completion of this report 07.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Barker, S Telephone No. +49 89 2399 8526 <div style="text-align: right;">  </div>

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/05471

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-15 as originally filed

Claims, No.:

1-7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/05471

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-7
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-7
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-7
	No:	Claims	

2. Citations and explanations
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/05471

Re. part V

- 1). The subject matter of the claims 1-7 is considered to be new and appears to involve an inventive step over the four documents cited in the International Search Report, which were cited as technical background (category "A") only. Accordingly, the requirements of Arts.33 (2) and (3) are considered fulfilled as are those of Art.33(4) as all claimed subject matter is considered to be capable of industrial application.

Re. part VIII

- 2). a) In claim 1 and the statement of invention in the description, the substances referred to as "THP", "THP salt", "THP condensate" and "THP analogue" should be referred to by their full names although "THP analogue" would appear to be a vague term which would be better defined by the definition given in the description at the paragraph bridging pages 3 and 4. (Art. 6 PCT)
- b) In claim 1 and the description, "pyrrolidone" should be spelled correctly. (Art.6 PCT)
- c) Claims 6 and 7 relate to steps in the preparation of leather which are not tanning steps per se. It appears that these claims are not correctly dependent on claim 4 and should therefore be reformulated. (Art.6 PCT)
- d) The description at the first full paragraph of page 4 is considered confusing as it makes unclear what precisely is intended by the initials "THP". suitable amendment is invited (Art.6 PCT).
- e) Regarding the explanation given at page 6 of the terms "adjacent", "vicinal" and "geminal", it is believed that in trimethylolpropane (2-ethyl-2-hydroxymethyl-1,3-propandiol, $\text{H}_5\text{C}_2\text{-C}(\text{CH}_2\text{OH})_3$) all methylol groups are attached to an "end" carbon of the propane chain which would make it another example of a geminal compound not a vicinal compound as described. Clarification is invited although care should be taken not to introduce new subject matter (Art.6 PCT).

PATENT COOPERATION TREATY

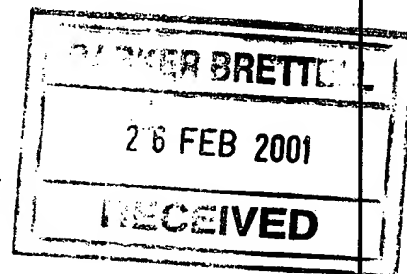
PCT

INFORMATION CONCERNING ELECTED
OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

From the INTERNATIONAL BUREAU

To:

BARKER BRETTELL
138 Hagley Road
Edgbaston
Birmingham B16 9PW
ROYAUME-UNI

Date of mailing (day/month/year)

15 February 2001 (15.02.01)

Applicant's or agent's file reference

PB767/PCT/RS

CDK1777

IMPORTANT INFORMATION

International application No.

PCT/EP00/05471

International filing date (day/month/year)

14 June 2000 (14.06.00)

Priority date (day/month/year)

18 June 1999 (18.06.99)

Applicant

RHODIA CONSUMER SPECIALTIES LIMITED et al

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

AP : GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW

EP : AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

National : AU, BG, CA, CN, CZ, DE, IL, JP, KP, KR, MN, NO, NZ, PL, RO, RU, SE, SK, US

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

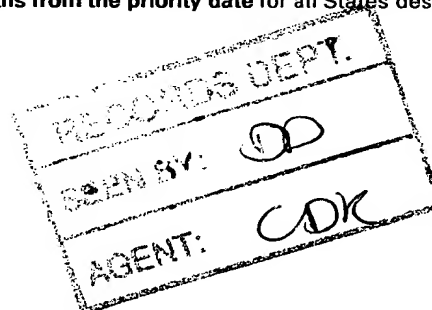
OA : BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

National : AE, AG, AL, AM, AT, AZ, BA, BB, BR, BY, CH, CR, CU, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IN, IS, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MW, MX, MZ, PT, SD, SG, SI, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW

3. The applicant is reminded that he must enter the "national phase" before the expiration of 30 months from the priority date before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

The entry into the European regional phase is postponed until 31 months from the priority date for all States designated for the purposes of obtaining a European patent.



The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer:

Juan Cruz

Telephone No. (41-22) 338.83.38

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 December 2000 (28.12.2000)

PCT

(10) International Publication Number
WO 00/79011 A1

(51) International Patent Classification⁷: **C14C 3/08**,
C08L 5/00, 29/04

(74) Agent: **SAVIDGE, Roger, Gordon, Madgwick**; Rhodia
Consumer Specialties Limited, 210-222 Hagley Road
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(21) International Application Number: **PCT/EP00/05471**

(22) International Filing Date: **14 June 2000 (14.06.2000)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
9914139.2 18 June 1999 (18.06.1999) **GB**
9918243.8 4 August 1999 (04.08.1999) **GB**
9918698.3 10 August 1999 (10.08.1999) **GB**

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, **US**, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **RHO-DIA CONSUMER SPECIALTIES LIMITED** [GB/GB];
210-222 Hagley Road West, Oldbury, West Midlands B68 0NN (GB).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **JONES, Christopher, Raymond** [GB/GB]; 110 Sutherland Road, Cheslyn Hay, Nr. Walsall, West Midlands WS6 7BS (GB).
COLLINS, Gareth, Rhys [GB/GB]; 22 Surrey Drive, Kingswinford, Dudley, West Midlands DY6 8HR (GB).
TALBOT, Robert, Eric [GB/GB]; 3 Meriden close, Cannock, Staffordshire WS11 1QG (GB).

Published:

- *With international search report.*
- *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **LEATHER TANNING**

(57) Abstract: A mixture of THP and a moderator is used to tan leather. The moderator is selected from metaphosphates and polyhydroxy or polypyrolidyl compounds such as glycerol, carboxydrates PVA or PVP.

WO 00/79011 A1

LEATHER TANNING

The present invention relates to a novel process for tanning leather.

Tanning is a process for the preservation of skins, by which is meant the collagen-containing integuments of vertebrates including mammals (e.g. cows, pigs, deer, goats, sheep, seals, antelope, mink, stoats and camels), fish, (e.g. sharks), reptiles (e.g. snakes, lizards and crocodiles), and birds (e.g. ostrich). Skins comprise a layer of collagen, and tanning entails reacting the collagen with a cross linking, or tanning, agent to cross link reactive sites within the collagen molecule. The product of the cross linking is leather, which is substantially less susceptible than skin to bacterial degradation.

A consequence of the cross linking is an increase in the minimum temperature at which the wet leather tends to shrink. This shrink temperature is often used as an indication of the degree of tanning.

The collagen layer of the skin is typically separated from fats, connective tissue and other subcutaneous protein, and optionally from the outer keratinous layer, by a combination of chemical and physical steps. The former may include liming, bating, pickling and/or degreasing.

The skin is then subjected to treatment in one or more stages with various tanning agents selected to give the desired end properties.

The main types of tannage are:- vegetable tannage, based on tannin as the active cross linking agent; mineral tannage using various polyvalent metal salts, especially salts of chromium, aluminium, iron, or zirconium; and synthetic tanning agents, referred to as "syntans". Syntans include replacement syntans which are active tanning agents capable of tanning leather when used as the sole tannage e.g. by reacting with collagen at two or more sites to form cross links, and auxiliary syntans

-2-

which are added to other tannages to modify the character of the leather but which are not in themselves active tanning agents. Auxiliary syntans are absorbed by the leather or may react with collagen at one site only. Syntans include various polymers and copolymers, such as those obtained by condensing formaldehyde with, for example, phenols and/or aryl sulphonates, and acrylate, methacrylate, acrylamide and/or acrylonitrile homopolymers and copolymers. Formaldehyde itself and dialdehydes such as glutaraldehyde are also used in tanning, usually in combination with other tannages.

For centuries the production of leather was based on the vegetable tannages which produce the characteristic brown colour traditionally associated with leather. One of the first mineral tannages was alum, but currently the most widely used tanning agent is chrome, usually in the form of basic chromium sulphate, which produces a blue grey leather with high shrink temperatures. However mineral tannages in general, and chrome tannages in particular are under pressure on environmental grounds. Syntans are less environmentally harmful than mineral tanning agents.

Tetrakis (hydroxymethyl) phosphonium salts which will be referred to herein as "THP salts" have long been used as fire-retardants for textiles and have been applied to the keratinous (fur) side of skins for this purpose. The salts may be applied directly to the fabric or in the form of precondensates which are water soluble or sparingly water soluble copolymers of THP with organic nitrogen compounds such as urea or an amine and which are referred to herein as "THP condensates". THP salts have also been known as possible ingredients of tanning liquors for more than thirty six years. US. 2 992 879 referred to THP chloride (THPC) as an unsatisfactory tanning agent on its own, and recommended a combination of THPC and a phenol such as resorcinol speculating that the two react together to form an effective tanning agent when the pH is raised. In fact THP salts do copolymerise with phenols such as resorcinol (see, for example, Textile Research Journal, December 1982, P743). US 3 104 151 describes the use of such THPC phenol copolymers as pretannages for leather in which the main tannage is vegetable or mineral. GB 2 287 953 describes the use of THP salts as cross linkers in conjunction with melamine formaldehyde or

urea formaldehyde prepolymers, in order to form a copolymeric tanning agent in situ in the tanning liquor. EP 0 559 867 describes the use of phosphonium salts such as THP sulphate (THPS) on raw or cured skin prior to tanning e.g. in acid degreasing. EP 0 681 030 describes the use of THPS as a cross linker for casein finishes applied to leather after tanning. GB 2 314 342 describes the use of hydroxyalkyl phosphines and phosphonium salts as tanning agents in conjunction with aromatic anionic syntans and EP 0 808 908 describes the use of THP salts with condensable nitrogen compounds.

THP salts are stable under acidic conditions in the absence of air or oxidising agents. At pH above 3 and in the absence of oxidising agents they are gradually converted to the parent base, tris(hydroxymethyl)phosphine commonly referred to as THP. Conversion is rapid and substantially complete between pH of about 4 and 6. Above pH 7, or in the presence of oxidising agents THP salts or THP are converted to tris(hydroxymethyl)phosphine oxide (THPO), conversion being rapid and substantially complete at pH above about 10, e.g. 12. It has been stated, e.g. in US 2 993 744, that THPO is the effective tanning agent in THP based tannages.

Contrary to statements in the art, THPO is not effective as a tanning agent for leather, and THP salts are also ineffective as tannages. Moreover THP used in conjunction with co-condensable monomers or polymers provides complex systems which are difficult to control to obtain consistent results.

WO99/23261 describes the use of THP on its own as an effective main tanning agent. THP is usually most effective when formed in situ by first impregnating the leather with a THP salt, in the substantial absence of monomers or prepolymers which react or copolymerise with THP and raising the pH above 4 and preferably above 5. WO99/23261 also describes the use of THP condensates as main tanning agents.

In addition to THP, compounds of the formula $R P(CH_2OH)_2$, referred to herein as "THP analogues", where R is an organic group which does not react chemically with collagen, such as a C_{1-20} alkyl, alkenyl, aryl, aralkyl, alkaryl, polyalkyleneoxy,

alkylpolyalkyleneoxy or polyalkyleneoxy alkyl group have been referred to in the literature as highly effective tanning agents.

For convenience "THP" will be used herein, where the context permits, to refer generically to THP, THP salts, THP condensates and THP analogues.

A major problem when tanning with derivatives of formaldehyde, including formaldehyde condensate syntans and THP is the evolution of formaldehyde during tanning and the presence of formaldehyde residues in the leather which give rise to objectionable odours and may cause a health hazard to process operators.

The steps required to produce leather including the pickling and degreasing which usually precede tanning, remove most of the natural oils and fats from leather. These are normally at least partially replaced after tanning by fat liquoring, which entails contacting the leather with an aqueous emulsion of oils and fats which soften and lubricate the finished leather. It has been found that leather which has been tanned with THP alone is tight and tends to be relatively hard. It requires high levels of fat liquor to soften it. It would be useful to be able to obtain the advantages of THP, but prepare a fuller, softer and more easily fat liquored leather.

It is often necessary to split, e.g. bovine leather, prior to retanning, in order to obtain the desired thickness. Conventionally tanned leather may split unevenly and the split leather may require substantial shaving to obtain a consistent thickness.

A further problem is swelling of the skin, control of which usually requires the presence of salts such as chloride or sulphate.

One object of the present invention is to provide tannages which exhibit the advantages of THP but provide leather which is fuller, softer and requires less fat liquor than leather tanned with THP alone.

A further object is to provide leather with lower formaldehyde levels during processing and on the finished leather, than are common in tannages based on

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formaldehyde derivatives. Another object is to provide leather which gives a more even split than conventionally tanned leather.

A further object is to obtain leather with reduced tendency to swell, compared with normal THP tannage.

We have now discovered that mixtures of THP with certain moderators, which appear to interact with THP to mask its OH groups at least partially, can be applied to skins to provide full soft leather which is readily fat liquored, contains reduced formaldehyde levels, is more easily split and shaved and exhibits reduced swelling tendencies.

We have found for example that a mixture of THP with a water soluble metaphosphate or with a water soluble polyhydroxy or polypyrolidone compound containing at least three adjacent, geminal or vicinal $>CR\ OH$ groups or pyrolidone groups provides improved tanning compared with THP alone, and in particular provides a soft, less tight and more easily fat liquored product.

The leather also shows reduced tendency to swelling which may be controlled without the use of salts.

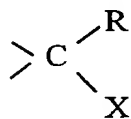
In addition formaldehyde levels, in the process and in the finished leather are substantially less using the aforesaid mixtures than are observed when THP is used alone.

It has also been found that leather tanned using the mixture is more easily shaved and split.

We believe that THP interacts chemically with the polyhydroxy compounds possibly by hydrogen bonding, and that this moderates the reaction with collagen.

Our invention therefore provides a mixture of THP as herein defined with at least one

water soluble moderator selected from (A) metaphosphate salts and (B) aliphatic polyhydroxy or polypyrolidone compounds comprising at least three adjacent, geminal or vicinal



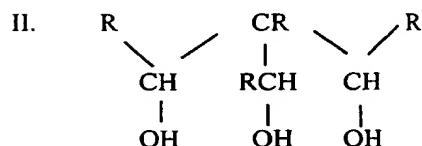
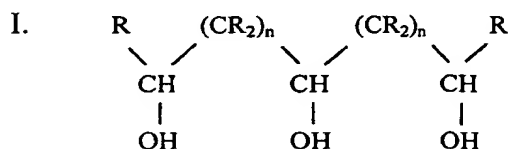
groups where R is hydrogen or an alkyl group, and X is a hydroxyl or

pyrolidone group.

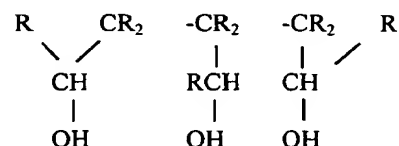
Our invention also provides a method of tanning or degreasing leather which comprises contacting collagen with a mixture as aforesaid.

Preferably the water soluble polyhydroxy or polypyrolidone compound has a molecular weight less than 200,000, more preferably less than 150,000, most preferably less than 100,000, e.g. less than 75,000. We especially prefer compounds with a mole weight less than 50,000.

The polyhydroxy compounds preferably comprise hydroxy methylene groups which may be adjacent (i.e. directly linked as in glycerol), geminal (i.e. linked to the same carbon atom as in pentaerythritol) or vicinal (i.e. linked to adjacent carbon atoms, as in trimethylolpropane). Thus the polyhydroxy compounds useful in the invention comprise compounds of the formulae:



and III.



wherein each n may independently be 0, 1 or 2 and each R is independently hydrogen

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or an alkyl, a hydroxy- or polyhydroxy- alkyl, a carbonyl, a carboxyl, a C₁₋₂₅ acyl, a carbonyl- carboxy- or C₁₋₂₅ acyl- substituted alkyl group or an alkyl group or hydroxy-, carboxy- carbonyl- or C₁₋₂₅ acyl substituted alkyl group which is interrupted by one or more ether or carbonyl linkages or wherein two or more R groups may together constitute one or more alicyclic rings, optionally substituted with one or more hydroxy, carbonyl, carboxy and/or acyl groups and/or interrupted by one or more ether or carbonyl linkages.

The aliphatic polyhydroxy compound may for example be glycerol, sorbitol, trimethylol propane, pentaerythritol, 1,2,3-trihydroxy butane, 1,2,3,4-tetrahydroxy butane, 1,2,3-trihydroxy pentane, 2,3,4-trihydroxy pentane, tetrahydroxy pentane, pentahydroxy pentane, water soluble carbohydrates including mono and disaccharides and soluble starches and alginates. Examples of suitable carbohydrates include sucrose, glucose, maltose, lactose, dextrose, fructose, xylose, arabinose, mannose, ribose and rhamnose and dialdehyde starch. The compound may also be a derivative of a carbohydrate including alkyl glycosides such as a C₁₋₂₅ alkyl glucoside or polyglucoside, or ascorbic, mannonic or gluconic acids, or alginates or sorbitol or mannitol or C₁₋₂₅ acyl esters of either sucrose or sorbitan. Generally we prefer not to use nitrogen containing derivatives.

A preferred group of polyhydroxy compounds comprises polyvinyl alcohols and, in particular, relatively low molecular weight polyvinyl alcohols. We prefer PVAs with a mean molecular weight less than 70,000, especially less than 50,000, e.g. less than 30,000.

Also highly effective in modifying the action of THP tannages is polyvinyl pyrrolidone which appears to function in an analogous manner to polyvinyl alcohol.

THP condensates containing high proportions of nitrogen and correspondingly low proportions of uncondensed THP, e.g. less than 4:1 molar THP:nitrogen compound are generally less effective with polyhydroxy or polypyrrolidone compounds than the uncondensed THP. However THP condensed with lower proportions of nitrogen

compound e.g. condensates with greater than 4:1, especially greater than 5:1, for instance 5:1 to 7:1 molar THP/nitrogen compound, which contain some free THP, give particularly good results.

The metaphosphate salt is a cyclic condensed phosphate having the formula $(MPO_3)_n$ where M is preferably alkali metal or ammonia, e.g. potassium or most preferably sodium and n is from 2 to 10, preferably 3 to 8, e.g. 5 to 7. Particularly preferred is sodium hexametaphosphate. In principle any water soluble metaphosphate salt of a cation which does not react with THP may be used.

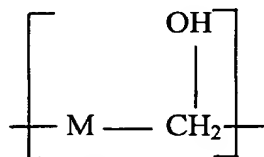
The relative proportion of THP and moderator may be equimolar or may comprise an excess of either component. Preferably the THP is in an excess of up to 20:1 molar, depending on the characteristics required. Generally the higher the proportion of polyhydroxy compound the less tight the leather. Proportions between 10:1 and 2:1 molar are generally preferred.

The THP and moderator may be supplied as or part of a formulated product, premixed or mixed in situ in the tanning operation.

The THP may be used in conjunction with syntans, e.g. by treating the skin with said THP and a sytan (preferably a sytan which does not react with THP under normal tanning conditions) and/or by treating the skin in a plurality of stages at least one of which entails treatment with sytan and at least one other of which entails treatment with the THP.

For the purpose of this specification "sytan" is used to refer to replacement syntans which are synthetic organic compounds capable of reacting with collagen at two or more sites to form cross links and also to auxiliary syntans which do not in themselves contribute substantially to the cross linking but which are physically absorbed by the leather or react at no more than one site so as to modify the physical properties of the leather. For example the term includes any water soluble polymer

prepared by copolymerising formaldehyde, which is capable of increasing the shrink resistance of collagen and which comprises at least two units of the formula



where each M is an aryl group such as a phenyl, naphthyl or aniline group substituted with one or more hydroxyl and/or sulphate, sulphone or sulphonimide groups or a urea or melamine residue. As used herein the term "syntan" also includes resin syntans which are homopolymers and copolymers of unsaturated carboxylic acids or their salts, esters, amides or nitriles, e.g. acrylic acid, methacrylic acid, acrylamide, acrylonitrile, maleic acid, fumaric acid, itaconic acid, aconitic acid, crotonic acid, isocrotonic acid, citraconic acid, mesaconic acid, angelic acid, tiglic acid and cinnamic acid. The copolymers may also comprise other vinylic comonomers such as styrene. Also included are acetone condensates with, for example sulphones and sulphonamides. Resin syntan may modify such properties as dye levelling, filling, grain appearance, break, grain strength, buffing nap, softness and tensile or tear strength.

The THP tends to react with nitrogen containing syntans and with other nitrogenous compounds and also to some extent with aromatic syntans. Such reactions may compete with cross linking reactions of both the THP and the syntan resulting in chaotic behaviour when the two are used together. Such systems are so highly sensitive to the conditions of use that it may be difficult to control them so as to obtain the consistent results required for a viable commercial process.

For these reasons we prefer not to use mixtures with such compounds. However it is possible to precondense the THP with, for example, cocondensable nitrogenous compounds such as urea, melamine, dicyandiamide and/or aliphatic amines to form condensates comprising two or more phosphorus atoms and having at least two hydroxymethyl groups.

High pH is preferably avoided because it converts the phosphine group to phosphine

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oxide, which is substantially ineffective as a tanning agent. We prefer that solutions for use according to our invention should have a pH less than 10, more preferably less than 9, especially less than 8, typically less than 7.5, most preferably 4.5 to 7. We prefer that the THP contains less than 15%, more preferably less than 10%, e.g. less than 9% of THPO based on the weight thereof. Generally the less THPO present the better.

The THP is preferably used in a total concentration of from 0.01 to 20% by weight based on the total weight of the tanning liquor, more preferably 0.5 to 10%, e.g. 1 to 5%, most preferably 1.5 to 4%. The total proportion of the THP used is preferably from 0.3 to 20% by weight based on the weight of wet skin, more preferably 1 to 15%, especially 1.5 to 10%, most preferably 2 to 5%.

We particularly prefer processes in which skins are treated with an auxiliary syntan prior to tanning with the THP.

When the mixture is used in combination with a syntan, the latter is preferably a polyacrylate, polymethacrylate, or copolymer of acrylic and/or methacrylic acid with acrylonitrile and/or acrylamide. Typically the polymer has a molecular weight in the range 1,000 to 200,000, more usually 3,000 to 100,000.

The syntan is preferably present at a concentration of from 0.5 to 35% by weight of the tanning liquor. e.g. 1 to 20%, more preferably 2 to 10% especially 3 to 6%. The total proportion of syntan used is preferably from 1 to 20% by weight based on the wet weight of skins, e.g. 2 to 10% especially 3 to 5%.

The proportion by weight of THP to syntan may typically be from 1:10 to 10:1, preferably 1:5 to 2:1, especially 1:2 to 1:1. The total proportion of tannages used is preferably from 2 to 20% active weight based on the wet weight of skins, e.g. 3 to 10%, especially 4 to 8%. The total tannage used preferably comprises more than 80% by weight, more preferably more than 90% by weight, e.g. more than 95% of the THP

and syntan. Where white leather is required, we prefer that the total tannages consist essentially of the THP and syntan. In particular we prefer the leather is not tanned with vegetable or mineral tannage.

The THP and polyhydroxy moderator may be used in conjunction with mineral tannages for example, a tannage containing a mixture of THP, chrome and moderator gives strongly synergistic tanning with high shrink temperatures and good area yield using only small amounts of chrome. Combinations of THP, moderator and aluminium salts are particularly preferred, especially aluminium triformate. The latter gives particularly high shrink temperatures. Alternatively the THP tannage may be used as a pretan or re-tan in a mineral tanning operation

The THP is preferably applied in the substantial absence of monomers or prepolymers capable of copolymerising with the THP such as phenol, urea, melamine or their precondensates with formaldehyde. For the purposes of this specification, "the substantial absence of monomers or prepolymers" means less than the minimum that would be capable of reacting or copolymerising with 50% of the THP, more preferably less than the minimum that would be required to react or copolymerise with 20%, e.g. less than 5% by weight based on the weight of THP, most preferably less than 2%, especially less than 1%.

The THP may be applied as a first tanning step with a syntan as a retan. Preferably the THP is applied to acidified skins following aqueous degreasing. E.g. the initial pH is typically below 5, e.g. below 4. We prefer that the pH be raised above 5 and preferably maintained above 6 for the main duration of the tanning process.

The skins are preferably agitated in the tanning liquor for a sufficient time to raise the shrink temperature above 75°C, more preferably above 80°C, most preferably above 85°C.

According to a particularly preferred embodiment the polyhydroxy compound is a surfactant such as a C₆₋₂₅ alkyl polyglycoside, sucrose ester or sorbitan ester and the

THP and polyhydroxy compound are applied to undegreased or partially degreased skins, in order to effect degreasing or further degreasing thereof.

The tanned skins are typically washed with warm water and fat liquored using a suitable oil or blend of oils. Fat liquoring is normally carried out after dyeing.

The invention will be illustrated by the following examples.

Example 1

60g pickled bovine skin was rotated for 10 minutes with 15% based on the wet weight of skin of 8% sodium chloride solution. 3% based on the wet weight of skin of 75% by wt. THP solution and 1% sucrose was added and the mixture rotated for 3 hours. The solution was basified to pH 6.5 by adding 2.25% based on the wet weight of skin of sodium bicarbonate and the skins left to rotate overnight.

After the first 3 hours penetration was tested with sodium selenite solution. A pale, even colour indicated even penetration throughout the skin. In contrast a control using THPS without sugar gave only surface action.

After basification a further sample was tested with sodium selenite solution. A strong orange colouration evenly distributed was observed throughout the skin. THP alone gave an uneven colouration. The example was repeated three times using respectively maltose, lactose and D-glucose instead of sucrose, all with similar results.

All the samples gave similar shrink temperatures within the range 81-83°C except for the lactose which gave a shrink temperature of 78°C, but the THP control felt hard and boardy while the other samples were soft and pliable. All the examples of the invention 1 to 12 described herein showed a reduction in formaldehyde level of between 30 and 45% compared with the control.

Example 2

400g of brine pickled pelt was rotated for 10 minutes with 150% by weight of water based on the wet weight of the skins at pH 4.6. 3% THP based on the wet weight of skins was added as a 75% aqueous solution together with 3%, based on the wet weight of skins, of glycerol. After 3 hours rotation at 35°C the pH was 3.38 and the shrink temperature was 58°C. After basifying to pH 4.2 with sodium bicarbonate the shrink temperature was 64°C. Basification to pH 5.5 gave a shrink temperature of 68°C. Further basification to pH 6.5 gave a shrink temperature of 77°C.

Testing with sodium selenite showed even penetration and the product was soft and pliable.

Example 3

200gm bovine pickled pelt was rotated overnight with a mixture of 3% based on the wet weight of skin of 75% wt/wt aqueous THPS and 3% based on the wet weight of skin of a 30,000 to 70,000 mole wt polyvinyl alcohol at a pH of 3.5. The pH was then raised to 6.5 with sodium carbonate. After a further hour's rotation the product was full and soft with a shrink temperature of 79°C.

Example 4

Example 3 was repeated using a polyvinyl alcohol of molecular weight greater than 70,000. The product was soft but less full than that of Example 3. The shrink temperature was 75°C.

Example 5

Example 3 was repeated using a 6:1 molar THPS/urea condensate instead of THPS. The product was soft and full. The shrink temperature was 78°C.

Example 6

Example 3 was repeated using a 3:1 molar THPS/urea condensate. The product was full but less soft than Example 3. The shrink temperature was 76°C.

Example 7

Example 6 was repeated using a PVA with a molecular weight greater than 70,000. The product was less tight and hard than that obtained using the urea/THP condensate alone, but not as full as that of Example 6. The shrink temperature was 75°C.

Example 8

Example 3 was repeated using polyvinylpyrrolidone of mole weight approximately 10,000 in place of PVA. The product was full and soft and had a shrink temperature of 77°C.

Example 9

Example 3 was repeated using a 2:1 molar THPS/urea condensate instead of THPS. The product was soft and full, with little residual odour.

Example 10

Example 3 was repeated using dialdehyde starch in place of PVA. The product was full and soft.

Example 11

60gm pickled bovine hide was rotated for 10 mins with 150% float containing 8% sodium chloride. 3% THPS/urea condensate (6:1 mole ratio) and 1% dextrose were

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added and the rotation continued for 3 hours. Small additions of sodium carbonate were made until the pH was 6.5.

Selenium indicator showed good penetration at the end of the three hour rotation. The shrink temperature was 75°C.

The leather was split and shaved prior to retanning with an acrylic resin sytan. The leather gave a more even split than a control without the moderator, and required less shaving.

The retanned leather was washed and fat liquored using 10% by weight of wet skin of a mixed sulphated/sulphited oil fat liquor, and finally dried.

The leather was a very full and soft white leather.

Example 12

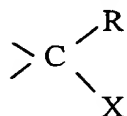
100gm bovine skins and 150% water based on wet weight of skin were rotated for 10 minutes with 8% sodium chloride based on wet weight of skin.

3% (based on the wet weight of skin) of a 76% aqueous THPS solution and 3% of sodium hexametaphosphate were rotated for 3 hours at pH 2 to 4 and then basified to pH 6.5.

The product was full and soft with a shrink temperature of 78°C.

CLAIMS

- 1) A mixture of THP or of a THP salt, THP condensate or THP analogue with at least one water soluble moderator selected from (A) metaphosphate salts and (B) aliphatic polyhydroxy or polypyrrolidone compounds comprising at least three adjacent, geminal or vicinal



groups where R is hydrogen or an alkyl group, and X is a

hydroxyl or pyrrolidone group.

- 2) A mixture according to claim 1 comprising a condensate of from 2 to 6 moles THP with 1 of urea.
- 3) A mixture according to either of claims 1 or 2 comprising a moderator selected from sorbitol, glycerol, trimethylolpropane, pentaerythritol, mannitol, mono and di- saccharide sugars, dialdehyde starch, alginates, polyvinyl alcohol and polyvinyl pyrrolidone.
- 4) A method of tanning leather which comprises contacting collagen with a tannage comprising a mixture according to any foregoing claim.
- 5) A method according to claim 4 wherein said mixture is used prior to, simultaneously with, or after tanning with a syntan and/or a mineral tannage.
- 6) A method according to either of claims 4 and 5 wherein the leather is subsequently fat liquored.
- 7) A method according to anyone of claim 4 to 6 wherein the leather is subsequently shaved and/or split.

INTERNATIONAL SEARCH REPORT

Inventor's Application No

PCT/EP 00/05471

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C14C3/08 C08L5/00 C08L29/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C14C C08L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 055 919 A (ALBRIGHT & WILSON) 11 March 1981 (1981-03-11) page 1, line 37 -page 2, line 40 examples 1,5	1
A	US 3 914 106 A (CHANCE LEON H) 21 October 1975 (1975-10-21) column 2, line 27 - line 62 example 11	1
A	US 2 992 879 A (WINDUS W. ET AL) 18 July 1961 (1961-07-18) cited in the application column 1, line 56 -column 2, line 43 column 3, line 12 - line 19 example 7	1,4,6

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

6 November 2000

Date of mailing of the international search report

13/11/2000

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INTERNATIONAL SEARCH REPORT

Int. Patent Application No.

PCT/EP 00/05471

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 99 23261 A (COLLINS GARETH RHYS ; JONES CHRISTOPHER RAYMOND (GB); WILLIAMS JANE) 14 May 1999 (1999-05-14) cited in the application page 4, paragraph 2 -page 5, paragraph 2 example 1</p> <p>-----</p>	1, 4-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

In: International Application No
PCT/EP 00/05471

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2055919 A	11-03-1981	NONE	
US 3914106 A	21-10-1975	US B328205 I	28-01-1975
US 2992879 A	18-07-1961	NONE	
WO 9923261 A	14-05-1999	AU 1336799 A	24-05-1999
		BR 9813033 A	15-08-2000
		EP 1027460 A	16-08-2000